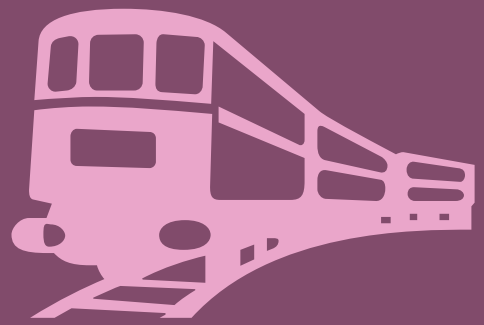

ENHANCING INFRASTRUCTURE

New York City's historical development and pre-eminence, as well as its current growth and success are predicated in part on its transportation offerings. Today, ensuring that we can use the infrastructure we have, and that our current systems are truly accessible to all New Yorkers is a key goal. Such efforts are vital not only for the 8.3 million New Yorkers but also to encourage and promote economic growth stemming from the 47 million visitors to New York each year. Indeed, enhancing our public transit system so that travel throughout the city is easy and "seamless "is one of the city's most important transportation goals. As New York embarks upon a massive re-branding campaign to increase New York's visibility as a tourist destination, increasing access to the city's transportation systems and enhancing the connectivity of the system has never been more important.

This report highlights five technologies and systems that have increased access and improved subway connections in other cities around the world and which could be implemented in New York.

- Designated ROWs
  - » Case Study 15: Physically Separated ROWs
  - » Case Study 16: Non-Physically Separated ROWs
- Internal Gangway Subway Cars
  - » Case Study 17: Articulated Subway Cars
- Bicycle Transit Centers
  - » Case Study 18: BikeStation and the McDonalds Cycle Center
- Wheelchair Access for the Subways
  - » Case Study 19: Wheelchair Escalators and Emergency Lifts
  - » Case Study 20: Universal Access Turnstiles
- Taxi Vouchers and Accessible Taxis
  - » Case Study 21: Chicago's Taxi Access Program

Cars double-parked in the bicycle lane on Lafayette Street in 2007.

NYC Dept . City Planning

DESIGNATED RIGHT-OF-WAY (ROW)

Many cities have attempted to solve their congestion problems by creating dedicated right-of-ways (ROW) on existing roadways. Traffic on dedicated ROWs is limited to a single type of vehicle (e.g. buses, trucks etc.) in order to increase speed and reliability. This report surveys two designated ROW scenarios:

- Physically Separated ROWs: TransMilenio, Bogotá, Colombia
- Non-Physically Separated ROWs, London, England and Rouen, France

Background:

A physically separated, designated right-of-way for buses in Xian, China. NYC Dept. City Planning

Designated ROWs reduce travel times and increase the reliability of scheduled services like buses or deliveries. Dedicated ROWs are typically associated with buses (for example New York's Select Bus Serivce) or carpool lanes, but are also used for bicycles (usually for safety reasons). Planners in Southern California, hoping to increase their capacity to move goods from the highly trafficked Los Angeles and Long Beach ports, are exploring options for designated ROW for trucks.[1]

ROWs for buses are an established concept in New York City. In 1971 the Port Authority of New York and New Jersey (PANYNJ) began operating a 2.5 mile exclusive bus lane (XBL) that runs contra-flow through the Lincoln Tunnel weekday mornings between 6:15 and 10:00 a.m..[2] In addition to the XBL the MTA and NYCDOT have recently begun a BRT demonstration project with one corridor in each borough.[3] More recently NYCDOT has designated five priority bus right-of-ways, one in each borough, to speed bus traffic and has begun another test project involving painting bus lanes a distinctive color.[4]

New York City's newly introduced designated right-of-ways for buses, shown here on lower Broadway in Manhattan, are already improving traffic conditions for buses and providing a safe haven for bicyclists. NYC Dept. City Planning

1 Pisano, Mark; Executive Director of the Southern California Association of Governments; Panel discussion at the NYU Wagner Rudin Center freight symposium, "Delivering the Goods: The Freight Needs of a Growing Population." May 6th 2007

2 Port Authority of New York New Jersey Website, "Lincoln Tunnel;" (http://www.panynj.gov/Commuting-Travel/tunnels/html/lincoln.html); Accessed 10/10/07

3 Metropolitan Transit Authority Website, "What is BRT?" (http://www.mta.info/mta/planning/brt/whatis.htm); Accessed 1/7/08

4 NYC Department of Transportation Website, "Press Release: DOT Paints Bus Lanes to Increase Visibility;" (http://www.nyc.gov/html/dot/html/pr2007/pr07_73.shtml); Accessed 8/17/07

Because constructing new roads is rarely an option in New York, the creation of dedicated lanes require planners and city officials to make decisions about the allocation of space on the roadway. In particular planners must weigh the public benefits gained from increased transit flow or faster goods movement against the cost of reducing space for personal cars. By and large, dedicated lanes for buses or trucks only make sense in areas that have significant traffic and high demand.

Beyond roadway allocation issues, the success of designated ROWs depends on sufficient enforcement. Clogged lanes can lead to reduced ridership and increased traffic congestion. For delivery trucks and freight uses, clogged lanes increase delivery times and transportation costs. For bicycles, poor enforcement of designated bicycle ROWs can lead to serious safety concerns as bikers find themselves suddenly competing for space with cars. Overall, poor enforcement mechanisms which lead to private cars clogging designated lanes reduces their efficiency and value and may drive away legitimate users.

Enforcement of designated ROWs is typically done through two main methods: physical separation, often achieved via physical barriers or grade separation, and non-physical separation, usually accomplished through visual cues and signage.

Physically separated ROWs are most often used for buses or bicycles and have proved to be effective at increasing speed, capacity and safety. The physical separation means that the lanes are self-enforcing as unauthorized motorists cannot enter the ROW. Physically separated ROWs for bus service are often implemented as a less costly alternative to rail service. Cities using physically separated ROWS also tend to build infrastructure for pre-boarding fare collection at stations, instead of on the bus, minimizing delays caused by boarding and alighting and allocate space for a passing lane at bus stops/stations. Some of the best examples of these ROWs are found in Bogotá, Colombia.

However, the physical separation also increases the logistical challenges to the implementation of such ROWs. For exmaple, a bus that breaks down in a one-lane physically separated ROW blocks all other buses behind it, but cordoning off two lanes for buses (express & local or stopping & passing) only is rarely a feasible option in a space-starved city like New York. In addition, New York has a significant amount of subterranean infrastructure (water, sewer, power) which must be accessible at short-notice; roadwork can cause disruptions to designated lanes.

Non-physically separated ROWs are more common than the physically separated. There is a large degree of variation in this type of ROW including signage listing hours of vehicle exclusion, painted lanes, contra-flow lane, shared use (ex. buses, HOVs, taxis, motorcycles, bicycles, trucks, etc.). Enforcement issues increase for non-physically separated ROWs since unauthorized vehicles can easily enter the lane. However, the lack of physical separation also makes it possible for the lane to accommodate different types or levels of traffic at different points throughout the day. This type of ROW is typically used on narrower streets where there is not sufficient room for physical separation and/or traffic is light enough that a 24-hour lane is unnecessary.

Case Study 15: Physically Separated Right-of-Ways (Bogota, Colombia)

A Transmilenio station in Bogota, Colombia. The double lane designated right-of-way allows for express and local service, while the physical barrier between the bus lanes and regular traffic reduce the need for enforcement.

Bogota, Colombia's TransMilenio Bus Rapid Transit (BRT) system is the world's largest network of physically separated ROWs. It was introduced in 1997 as a means to reduce Bogota's considerable traffic congestion and pollution. It was designed in two phases, encompasses six "trunk" lines and covers 51.2 miles.[5] Modeled off a BRT system already in operation in Curitiba, Brazil, TransMilenio uses high capacity articulated buses running on exclusive, dedicated ROWs that are two lanes wide, to allow buses to pass one another.[6] Construction of the lanes required significant road widening and some demolition.

The introduction of the physically separated ROW to Bogota's highly congested existing bus system has reduced travel times by 38%, reduced noxious emissions by 40% and increased ridership since buses are no longer caught in traffic or slowed by private cars.[7] Before the implementation of the TransMilenio BRT service, bus speeds on some of the routes now served by trunk lines were as low as 7.5 mph (Calle 80). After implementation average speeds for local service were 13 mph and 20 mph for express service.[8]

The double lane system also allows local and express service to operate on the same trunk line, with ROW capacities of 280 buses per hour per direction (phpd), nearly 45,000 passengers phpd.[9] Ridership has soared. By 2003 there were nearly 800,000 passengers per day using the system. With the opening of the second phase in 2004 ridership rose to 900,000 and by 2006 ridership was 1,050,000 passengers per day.

To further reduce travel times, Bogota has introduced pre-boarding ticketing which allows passengers to board buses as quickly as they arrive. These factors combined allow the system to maintain 2 minute headways during peak hours and 6 minute headways off-peak.[10] Due to the physical divider, a thin raised concrete barrier which is often painted a bright color to increase visibility, little is needed to enforce the separation of designated lanes from general traffic or to keep private cars out.

The cost per kilometer has increased from US$5.1 million for phase 1 to US$7.5 million for phase 2. Infrastructure costs are

5 Alasdair Cain, Georges Darido, Michael R. Baltes, Pilar Rodriguez, Johan C. Barrios, "Applicability of Bogotá's TransMilenio BRT System to the United States," Federal Transit Administration, US DOT, Final Report, 2006, (www.nbrti.org/media/documents/Bogota%20Report_Final%20Report_May%202006.pdf); Accessed 8/23/07

6 ibid.

7 ibid.

8 Hidalgo, D., "TransMilenio Bus Rapid Transit System Expansion 2002-2005 – Bogotá, Colombia," Akiris de Colombia S.A., Bogotá, Colombia, (www.codatu.org/english/publications/proceeding/conference/codatu11/Papers/hidalgo.pdf); Accessed 8/22/07

9 ibid.

10 Alasdair Cain, Georges Darido, Michael R. Baltes, Pilar Rodriguez, Johan C. Barrios, "Applicability of Bogotá's TransMilenio BRT System to the United States," Federal Transit Administration, US DOT, Final Report, 2006, (www.nbrti.org/media/documents/Bogota%20Report_Final%20Report_May%202006.pdf); Accessed 8/23/07

covered with local revenues from a gasoline tax (25% surcharge), about US$70 million/year, and national grants, about US$100 million/ year, from 2004 to 2016.[11] In 2006, the estimated daily revenue was about US$573,000. Annual ridership was 315 million passengers in 2005, with operating revenues of about $172 million.[12]

11 Hidalgo, D., "TransMilenio Bus Rapid Transit System Expansion 2002-2005 – Bogotá, Colombia," Akiris de Colombia S.A., Bogotá, Colombia, (www.codatu.org/english/publications/proceeding/conference/codatu11/Papers/hidalgo.pdf); Accessed 8/22/07

12 Alasdair Cain, Georges Darido, Michael R. Baltes, Pilar Rodriguez, Johan C. Barrios, "Applicability of Bogotá's TransMilenio BRT System to the United States," Federal Transit Administration, US DOT, Final Report, 2006, (www.nbrti.org/media/documents/Bogota%20Report_Final%20Report_May%202006.pdf); Accessed 8/23/07

Case Study 16: Non-Physically Separated Right-of-Ways (London, England; Rouen, France)

Bicycles, motorcycles and buses share a non-physically separated bus right-of-way in London. The colored asphalt increases the visibility of the right-of-way. Crown copyright, from DfT TAL207, reproduced with permission.

Designated ROWs for buses were first introduced in London in the late 1960's. Initially a success, London's bus lanes deteriorated throughout the 1980's and 1990's due to lack of funds and insufficient enforcement. In 2000, London's bus system, including its designated bus ROWs, underwent a massive overhaul in preparation for London's Congestion Pricing plan.[13] Revenue from the Congestion Pricing is funneled

13 Transport for London (TfL), "The case for investing in London's buses: Presenting the results of the London Buses Strategic Review;" September 2003

back into the bus system, guaranteeing an on-going funding source for enforcement, future repairs and upgrades. Some of the bus lane improvements that the city of London and the bus operator Transport for London (TfL) have implemented are pre-boarding fare collection at some locations, distinctive lane color, GPS signal priority at traffic lights, closed circuit TV (CCTV) enforcement of the lanes, and shared use by certain vehicles. Today, designated ROWs in London carry over 6,500 scheduled buses holding around 5.4 million passengers on over 700 different routes per day or 1.5 billion passengers annually.[14] Rouen's system, called TEOR, is considerably smaller. First introduced in the late 1990's, it carries 90,000 passengers per day on approximately 200 buses. [15]

London's dedicated ROWs tend to be curb side bus lanes (running along the left lane parallel to the curb) which limits delays caused by private vehicles pulling into and out of parking spaces. Many of the lanes are painted a distinctive red to further visually remind motorists not to enter the lanes. Rouen's ROWs are also painted a distinctive color, but rather than operating in the curb lane the ROW is the center lane. In addition to the color, the lanes are demarcated by a different type of pavement at the border between the exclusive lane and the general traffic lane, giving motorists a physical and audible reminder if they enter the lanes.[16]

In London, which has a far larger population than Rouen and thus higher demands on its roads and space, the lack of a physical divider separating buses from the general traffic increases the flexibility of the bus lanes. For example, while highly-trafficked major arteries need exclusive ROWs for buses at all times, streets that have heavy peak traffic loads but low traffic volumes in the off-peak hours or infrequent bus service do not. At off-peak hours, bus lanes can be used by general traffic, thus increasing the amount of road space available. In such cases, signs posted along the bus lane inform users of the hours of use (unless it is a 24-hour lane) and the types of vehicles that are allowed to use the lanes.

The absence of a physical divider also means that London's bus lanes can be, and are, shared by other modes of transportation such as bicycles and taxis. Bus lanes are designed to be wide enough for buses to overtake cyclists and are intended to increase bicycle safety (TfL's preferred width is 13 feet). This multi-use ROW dramatically increases the bicycle lane network across the city. In addition, TfL is examining the introduction of motorcycles and motor scooters (known as powered two wheelers or PTW) into designated lanes. This is part of the City's plan to promote PTW use as a way to reduce congestion and emissions. This is still being studied and a final decision has not yet been made.[17] Elsewhere, traffic planners in Scotland have considered allowing smaller freight vehicles (lorries) to use their designated bus lanes, presumably this would be for through traffic not for deliveries.[18]

However, that same absence of a physical divider that increases lane and use flexibility means that the city of London and TfL must provide significant monitoring and enforcement mechanisms that are unnecessary in Bogota's closed system. Like many other cities with bus lanes that do not have self-enforcing physical separation London has had problems with cars illegally entering the designated bus ROWs and causing delays for buses and dangerous conditions for cyclists.

Beyond normal police enforcement, closed circuit television cameras (CCTV) are the primary monitoring and enforcement tool. Introduced in pilot form in 1999, the camera enforcement

14 Transport for London (TfL), "The case for investing in London's buses: Presenting the results of the London Buses Strategic Review;" September 2003

15 Transportation Research Board, "Bus Rapid Transit Volume 1: Case Studies in Bus Rapid Transit" TCRP Report 90 Volume 1 BRT Case Studies, (gulliver.trb.org/publications/tcrp/tcrp_rpt_90v1.pdf) Accessed 8/22/07

16 Transports en Commun d'Agglo. Rouen Website, (http://www.tcar.fr/presentation/index.asp?rub_code=52&thm_id=317&gpl_id=); Accessed 12/21/07

17 Department for Transport, "The Use of Bus Lanes by Motorcycles: TRAFFIC ADVISORY LEAFLET" Department for Transport, February 2007, (http://www.dft.gov.uk/pgr/roads/tpm/tal/trafficmanagement/trafficadvisoryleaflet207); Accessed 8/23/07

18 BBC News Website, "Bus lanes 'could open to freight';" July 3, 2006. (http://news.bbc.co.uk/2/hi/uk_news/scotland/5143396.stm); Accessed 12/21/07

produced remarkable results, a reduction of violations by up to 80% in some areas, and a significant increase in bus speed and reliability.[19] By 2000 about 300 bus lanes were being monitored by cameras and 151 cameras had been mounted on buses for additional enforcement.[20] The cameras record images of license plates and the surrounding conditions (for example, if a vehicle entered a lane to avoid an emergency vehicle no ticket is issued) and issue a ticket to the owner of the vehicle. The fine for driving or parking in a bus lane is high enough to serve as a deterrent. It was set at £80 ($161) in 199, increased to £100 ($201) in 2004, and has since been raised again to£ 120 ($242). [21]

In addition to stationary CCTV cameras and bus mounted cameras, some boroughs have introduced additional mobile enforcement units, consisting of cars with CCTV cameras driving around to identify violators.[22] By 2004 there had been an increase to 900 bus mounted cameras and 500 roadside cameras, issuing as many as 100,000 summonses a year and saving an average of 10 minutes in travel times for bus commuters. The revenues generated from the bus lane inforcement have repaid the cost of their installation.[23]

TfL's study of bus lanes in London found that between 2000 and 2005 waiting times for buses fell by 15%, largely due to enforcement. Over the same time period, buses in bus lanes traveled about 13% faster than those on routes with out designated bus lanes. With enforcement, violations have decreased, there has been an 85% decrease in fines for bus lane infractions between 2003 and 2005.[24]

Both London and Rouen augment their bus service with signal prioritization and pre-paid boarding options that allow buses in their designated ROWs to travel even faster and more efficiently. An overview of these technologies is included in Appendix C.

Examples and Opportunities in New York City:

Designated ROWs can help New York meet the PlaNYC 2030 goal of improving and expanding bus service. NYCDOT's Select Bus Service, modeled in part off BRT services in other cities, has substantially increased bus speeds on specific routes throughout the five boroughs. In addition, designated ROWs could be used to increase bicycle safety and improve freight movement around the city.

Larger streets with high levels of congestion and significant bus traffic or streets that are underserved by transit may benefit from a physically separated bus ROW. Some major roads, like the Grand Concourse and Queens Boulevard, already have some degree of physical separation and may lend themselves to further introduction of physically separated ROWs. On-going maintenance and handling roadwork would be major issues.

In addition, designated ROWs could be of particular value for bicycles and freight. Physically separated bike-lanes, including lanes that use parked cars as a buffer, can significantly increase bicyclist and pedestrian safety. For freight, the creation of priority "Truck Lanes" along major New York City truck routes could reduce goods transportation time and costs and lower air pollution.

19 Department for Transport, "Bus Priority: The Way Ahead," Department of Transport, 2004, (http://www.dft.gov.uk/pgr/regional/buses/bpf/busprioritythewayahead12/); Accessed 8/29/07

20 Michael McCahill and Clive Norris, "Working Paper No.6 CCTV in London" Center for Criminology and Criminal Justice, University of Hull, June 2002, (www.urbaneye.net/results/ue_wp6.pdf) Accessed 8/28/07

21 Transport for London, "Keep London Moving," Transport for London, 2006, (http://www.tfl.gov.uk/roadusers/finesandregulations/963.aspx); Accessed 8/24/07

22 London Borough of Lambeth Website, "CCTV enforcement of parking and traffic contraventions;" (http://www.lambeth.gov.uk/Services/TransportStreets/Parking/CCTV.htm); Accessed 12/21/07

23 Transportation Alternatives Magazine Website, "More Lessons from London: Bus Lane Enforcement Cameras;" 2004 (http://www.transalt.org/press/magazine/041Winter/16buscameras.html); Accessed 12/21/07

24 BBC News Website, "Bus lanes 'improves journey times';" June 13, 2006 (http://news.bbc.co.uk/2/hi/uk_news/england/london/5075520.stm); Accessed 12/21/07

ARTICULATED SUBWAY CARS:

The reconfiguration of the interiors of train and subway cars is another technique employed by cities around the world to increase the capacity of their subway systems while minimizing costly, long-term infrastructure overhauls. As specific seating layouts are based on a variety of city-specific policy decisions (commuter rail vs. short-hop transit for example require different seating configurations), this report focuses on overall subway car redesigns.

Background:

The interior of the MTA's new R160 subway car.

Four major options exist for increasing subway capacity:
1) increasing the number of trains, 2) increasing the length of current trains sets (ie adding cars to the trains), 3) building new subway lines and, 4) reconfiguring train designs to accommodate more passengers.

Despite their obvious benefits, most of these options would be costly and time-consuming. As New York's almost 80-year experience with the 2nd Avenue subway attests, building new subway lines is a slow, costly and politically fraught endeavor.[25] Adding more subway cars to trains, proposed as early as 1920 as a way to reduce congestion on the IRT lines, would require extensive platform extensions and track reconfiguration.[26] In addition, since New York's subway runs 24 hours, platform extensions could increase congestion in the short term while the work is underway.

More recently, the MTA has proposed adding trains to the 4 and 5 trains to reduce pressure, but Howard Roberts, the NYCT president cautions that such an undertaking would take years.[27] Increasing train frequency (decreasing headway between trains) requires substantial upgrades to the subway signal system to prevent accidents. Some of these upgrades are already in progress. But, even when upgrades are made, the number of trains that a single track can hold is limited. The 4 and 5 trains, for example, which are the most congested lines in the city, already run at a frequency of 27 trains per hour during rush hour.[28]

In contrast, redesigning the subway car itself can be implemented relatively quickly as part of planned subway car upgrades. Articulated subways, essentially subway trains with open passages between all the cars on a train as opposed to discrete, closed cars, are a prime example of car redesign. Unlike the other options which require intensive capital campaigns and massive transit disturbances as the MTA retrofits existing stations, installs new signals or builds new tunnels, car redesign does not impact the existing subway infrastructure. In addition, since subway cars are constantly being upgraded, redesigned cars can be phased in with normal replacement and within existing budget allocations.

25 According to the MTA, plans for an underground 2nd Avenue Subway date back to 1929. The 2nd Avenue Elevated was torn down in 1942 and the 3rd Avenue Elevated in 1956.
26 Staff, "Have Plan to Raise Capacity of Subway," The New York Times, 26 January, 1920
27 Neuman, William, "Some Subways Found Packed Past Capacity;" The New York Times, 26 June 2007
28 ibid.

Case Study 17: Articulated Subway Cars (Toronto, Canada; London, England; Shanghai, China)

The exterior of one of Shanghai's internal gangway subway cars. Similar to an elongated bus, the moving gangway between subway cars is protected by a flexible "accordion" casing allowing passengers can travel freely throughout the length of the train. NYC Dept. City Planning

Articulated subways are in use in a variety of transit systems, including Shanghai, Bangkok, Barcelona, Berlin, Brussels, Bucharest, Delhi, Hong Kong, Melbourne, Paris, Singapore; and Stockholm and will be introduced in Toronto and London by 2009.[29] Developed by Bombardier, articulated subways (Bombardier's MOVIA series) convert the unused open space between the cars into usable, enclosed space increasing the carrying capacity of each train by providing additional standing room. Passengers can move within the train which alleviates crowding in specific cars. Importantly, articulated subways can be built to the same dimensions as existing cars allowing them to be phased in without requiring costly and time-consuming station renovations and track work.

Over the past few years, both Toronto and London have released plans to purchase articulated cars as part of their system upgrades. In 2006, the Toronto Transit Commission (TTC), the system operator, ordered 234 Toronto Rockets, articulated cars, from Bombardier to replace Toronto's old H4 and H5 trains. Like the current trains, these cars will be grouped into six-car trains.[30] The TTC estimates that the new articulated Bombardier trains will have 7.5% more usable interior space than their newest T1 trains which began operations in 1996 and by 13% over the H4 and H5 trains that they will replace.[31]

In addition, because passengers can move freely throughout the length of the articulated train, Toronto also expects to see a variety of passenger safety improvements, including a 50% reduction in emergency evacuation times and shorter emergency detection times.[32] The Toronto Rockets also boast of dramatically increased reliability, a maximum fire load reduction of 25% and reduced costs through car design of approximately $45 million.[33]

The city of London is also preparing to introduce articulated trains to its Underground lines. In December, 2006, MetroNet released plans to add 190 Bombardier MOVIA 237 and Bombardier MOVIA 238 trains for Circle, District, Hammersmith & City and Metropolitan lines.[34] The trains will run in 7-8 car trainsets. TfL estimates that the new articulated Circle, District, Hammersmith & City and Metropolitan trains which feature a new seating layout will have 8.7% more room than London's existing rolling stock.[35]

29 Email Correspondence with Thierry Marechal; International Association of Public Transport (UITP); 11/07/07

30 Toronto Transit Commission Website, "New Subway Trains;" (http://www.toronto.ca/ttc/new_subway_train/new_train_preview.htm); Accessed 12/18/07

31 Email Correspondence with Chris Heald, Head of Rail Vehicles Projects, Toronto Transit Commission, 11/16/07 & Toronto Transit Commission Report; "Proposal No. P31PD05761;" August 2006

32 Email Correspondence with Chris Heald, Head of Rail Vehicles Projects, Toronto Transit Commission, 11/16/07

33 Toronto Transit Commission Report; "Proposal No. P31PD05761;" August 2006 ("Fire Load" is defined as the heat at which an enclosed space burns. A reduction in the maximum fire load means that the new internal gangway cars would burn at a lower temperature, thus increasing passenger safety.)

34 MetroNet Website, "MetroNet Reveals Look of Future Underground Trains;" (http://www.metronetrail.com/default.asp?sID=1165400503609); Accessed 11/19/07

35 http://www.metronetrail.com/default.asp?sID=1165400503609

Top: The interior of one of Shanghai's articulated subway cars. NYC Dept. City Planning Bottom: A rendering of Toronto's new Rocket articulated trains. Image used with permission of Toronto Transit Commission and Bombardier.

The Circle, District, Hammersmith & City and Metropolitan trains are comparable to New York City's own R142 trains which run on the 2, 4, 5, and 6 Lines. They have similar lengths and widths (51' long by 9'-9'6" wide) and have similar seating capacity (37 seats per car for the NYCT R142 and 38 seats per car for the London trains). As seen in Table 1, NYCT's R142 trains have a standing capacity of 73 people per car, assuming 3 square feet per passenger. When adjusted to take differing loading standards into account (TfL estimates 2.15 square feet/passenger; MTA guidelines are 3 square feet/passenger), the articulated Circle, District, Hammersmith & City and Metropolitan trains will carry 78 per car, a 7% capacity increase over New York City or 50 additional people comfortably per train.[36] At NYCT crush capacity (1.7sf/px), the articulated Circle, District, Hammersmith & City and Metropolitan trains would have a 9% capacity increase over R142 trains at crush capacity.[37] In other words, at peak hours, London's iarticulated trains could accommodate 110 more people per train than the R142 trains.

Toronto's new trains will have larger increase in capacity (23%) over the NYCT R142 trains. However most of this increase is due to the fact that Toronto's trains are a full foot wider than NYCT's IRT trains. A fairer comparison for Toronto's trains is NYCT's wider R160 trains which are anticipated to run on the J, Z, L, M, N and Q lines in 8-10 car trainsets. The R160 trains will have a standing capacity of 101 passengers per car. Toronto's trains, when adjusted for the NYCT loading standards and the shorter length of the R160, will carry 106 passengers per car, a 5% increase or 40 additional passengers comfortably per train on the J, Z, M and L and an additional 50 passengers comfortably per train on the N and Q.[38] Once adjustments have been made for differing train lengths and loading standards, London's new

36 Email Correspondence with Steve Newsome, Head of International & European Affairs, Transport for London, 11/12/07

37 NYCT data provided by the NYC Department of City Planning, Transportation Division

38 The Toronto Transit Commission's guideline loading standards are 4 people per square meter. At this level, the new Toronto trains would carry 142 people per 75' car or about 115 people per 60'6" car (60'6" is the length of the R160 trains). Data provided by Chris Heald, Head of Rail Vehicles Projects, Toronto Transit Commission (Email conversation with Chris Heald, Head of Rail Vehicles Projects, Toronto Transit Commission, 11/16/07)

trains have 8% less room than the NYCT R160 trains, however this is also most likely due to the greater width (10') of the R160 trains.

Table 1: Capacity Comparison	NYCT R1421	NYCT R160	Toronto Rocket2	Circle, District, Hammersmith & City and Metropolitan (TfL)3
Car Length	51'	60'6"	75'	51'
Car Width	9'	10'	10'2"	9.5'
Number of Cars Per Train	10	8	6	8
Seats Per Car	37	44	65	38
Total Train Capacity Guideline	1100	1160	1279	1182
Original Capacity Assumption	3sf/px	3sf/px	2.7sf/px	2.15sf/px
Standing Capacity per Car	73	101	148	110
Adjusted Standing Capacity—Guideline (3sf/px)	Same	Same	132	78
Adjusted Standing Capacity—Crush (1.7sf/px)	128	186	235	139
In Comparison to NYCT R142 (51')—Guideline	NA	17%	23%	7%
In Comparison to NYCT R160 (60'6")—Guideline	-14%	NA	5%	-8%

Both London and Toronto's transit authorities explored the possibility that the articulation would reduce the turning radius on their trains and have concluded that the impact is negligible.[39] In general, a reduction in turning radius would limit the speed at which a train could make a turn, thus reducing headway speeds along the system. In Toronto, the TTC has ordered extensive tests including laser measurement of their tunnels in order to better understand the potential impacts of the articulation on the turning radius of their trains. They have concluded that the Toronto Rocket will meet TTC's minimum service curve radius of 380 feet and minimum yard curve radius of 230 feet.[40]

39 Email Correspondence with Steve Newsome, Head of International & European Affairs, Transport for London, 11/15/07 and Email conversation with Chris Heald, Head of Rail Vehicles Projects, Toronto Transit Commission, 11/16/07

40 Email Correspondence with Chris Heald, Head of Rail Vehicles Projects, Toronto Transit Commission, 11/16/07

The cost of the new articulated Bombardier cars is similar to that of "closed car" trains purchased by other major transit systems including NYCT, SEPTA (Philadelphia) and MARTA (Atlanta). In 2006, the adjusted unit price for Toronto's trains was just under $2 million US dollars.[41] In contrast, NYCT's R142 cars cost between $1.8 and $2.3 million. MARTA and SEPTA both spent more than Toronto for their new subway car purchases. NYCT's R160's and CTA's new cars cost slightly less.

Table 2: Price Comparison	TTC	NYCT R142	NYCT R142	NYCT R160	MARTA	SEPTA	CTA
Quantity	234	710	120	660	100	104	406
Adj. Unit Price (2006 US $)	$1,989,000	$1,827,000	$2,268,000	$1,575,000	$2,565,000	$2,088,000	$1,746,000
Price Difference	NA	($162,000)	$58,000	($414,000)	$355,000	$99,000	($464,000)

Examples and Opportunities in New York City:

Introducing articulated subway cars to NYCT's existing subway fleet could help to temporarily address overcrowding on some of New York's congested transit routes.

Articulated subway cars do not require additional infrastructure, platform or track enhancements, thus these cars represent a way to increasing capacity without impeding future track enhancements. In addition because new subway cars have already been budgeted for, introducing articulated cars may be possible even in the MTA's tighter budget environment.

Articulated cars demonstrate a capacity increase over the narrower A division lines and could be studied as a way to further boost capacity on the wider B division lines. Articulated cars should be considered for the 2nd Ave. "T" line.

41 Toronto Transit Commission Report; "Proposal No. P31PD05761;" August 2006. The report normalized the cost information to account for inflation and converted it all to Canadian dollars to facilitate easy comparison. In this analysis, all cost information has been reconverted into US dollars based on the spring 2006 dollar.

BICYCLE TRANSIT CENTERS

Secure bicycle parking options are an important part of New York's bicycle infrastructure. Placing Bicycle Transit Centers at transportation hubs and/or in central business districts enhances bicycle options and can encourage bicycle use as part of a multi-modal commute.

Background:

Bicycles parked on E. 5th Street in Manhattan. Bicycle users in New York City cite the lack of bicycle parking as the biggest deterrent to bicycle use. NYC Dept. City Planning

With the increase of on-street bicycle lanes and greenways, as well as a rising interest in sustainable modes of transportation, bicycle commuting is becoming more common. Increasingly popular as a mode of transit with women and older adults, the bicycle riding demographic has grown beyond just those who sport spandex.[42] More bicycles are on the street today, thus increasing the need for secure bicycle parking, as well as more bicycling paths.

Bicycle r commuting tends to increases when commuters know their bicycles will be safe. In New York City however, bicycle commuting is often discouraged by insufficient bicycle parking options. Every make and model of bicycle is a target for theft and bicycles can easily be resold on websites such as craigslist and eBay. As identified in the NYC Department of City Planning's 2007 New York City Bicycle Survey, 51% of the 1,400 respondents cited a lack of safe and secure bicycle parking as the prime deterrent to bicycle use in the city.[43] Commuters who would or could otherwise commute to work by bicycle, or to bicycle to a subway or train station that is out of walking distance, may be unwilling to do so if there is any concern that their bicycle will not be where they left it at the end of the day.

To address the scarcity of legal bicycle parking, the NYC DOT sponsors and operates the CityRacks program which has installed 4,672 racks since 1996.[44] DOT plans to add 1,200 more CityRacks through the five boroughs by 2030.[45] DOT has also introduced 37 covered bicycle parking kiosks as part of the Coordinated Street Furniture Franchise and has taken the unprecedented step of replacing car parking spots with bicycle racks outside a subway station in Brooklyn.

New York City's Zoning Resolution also offers options for bicycle parking in special districts like Hudson Yards, Downtown Brooklyn and Long Island City. In these areas, commercial buildings must set aside up to 400 square feet for interior bicycle parking; enough room for about 33 bikes.[46] Also in accordance with PlaNYC 2030, the city will "pursue legislation to require that large commercial buildings make provision for bicycle storage either on site or reasonably nearby."[47] A zoning text amendment that would require bicycle parking in new buildings is currently

42 Reagan, Gillian, "The Spokes-Models;" The New York Observer; 4 September 2007.

43 NYC Dept. City Planning, "The New York City Bicycle Survey;" NYC Dept. City Planning, May 2007, p. 2

44 Phone Interview with Jason Accime, CityRack Director, NYC Department of Transportation, 11/21/2007.

45 Bicyclists CityRacks Program, "CityRacks," NYC Department of Transportation, < http://www.nyc.gov/html/dot/html/bicyclists/bikerack.shtml> Accessed 11/16/07

46 The Zoning Resolution of the City of New York: ZR93-85 Hudson Yards Indoor Bicycle Parking, ZR 101-45 Downtown Brooklyn District Indoor Bicycle Parking, ZR 117-541 Long Island City Mixed Use District Indoor Bicycle Parking

47 Office of the Mayor of the City of New York, "2030 PlaNYC;" The City of New York, Presented 22 April, 2007, pp.87-88.

in public review. For city employees, the City of New York has recently begun to offer secure bicycle parking for city employees who work in Lower Manhattan.

Case Study 18: Bikestation & McDonalds Cycle Center (California; Arizona; Seattle, WA; Chicago, IL)

The McDonalds Cycle Center in downtown Chicago, offers amenities such as lockers and showers and a café. Image used with permission of McDonalds Cycle Center

Bicycle transit centers such as the Bikestation facilities and the McDonalds Cycle Center encourage bicycling by providing secure bicycle parking and other amenities targeted toward bicyclists. Bikestation, a major bicycle transit center proponent, operates facilities in Berkeley, San Francisco, Long Beach and Santa Barbara in California, Seattle, Washington, Tempe, Arizona; and has provided consulting services for other bicycle transit centers, including the McDonalds Cycle Center which opened in 2004. The newest Bikestation, the Union Street Bicycle Transit Center in Washington D.C, is breaking ground in fall 2008.

At the McDonalds Cycle Center and most Bikestation facilities, members have 24 hour access to secure bicycle storage, repair shops and other amenities—using either a membership card or a key pass. Lockers and showers, food services and internet access are typically provided; the Washington DC Bikestation, however, will provide a changing room, but no restroom and showering facilities.[48] The added amenities are intended to make bicycle riding more attractive to business commuters who otherwise have no place to change into work attire. The centers are located at transit hubs and near bike paths to further encourage bicycle commuting.

Membership fees—which provide access to lockers, showers and other amenities—range from around $90/year (Palo Alto and Santa Barbara Bikestations) to $149/year (McDonalds Cycle Center). In most facilities, daily memberships of around $1/day are also available. Most Bikestations, as well as the McDonalds Cycle Center, allow non-members to park their bicycles for free but charge a nominal fee for locker room access.

Data from Chicago and the various Bikestation facilities indicates that the demand for secure bicycle parking is high. Bikestation Seattle opened in 2003 with 75 spaces and was already maxing out its available space within the first 18 months.[49] Bikestation Berkeley, located on the mezzanine level of a BART station, reaches 100% capacity almost every day.[50] Bikestation Long Beach expanded in 2005 to 44 self-serve spaces and 32 valet spaces due to overwhelming demand.[51] The McDonalds Cycle Center in Chicago has 300 parking spaces and 150 lockers; all 200 annual memberships were sold in the first two weeks.[52] The McDonalds Cycle Center in Chicago now has capacity for 500 annual members.[53] The Union Street Bicycle Transit

48 District Department of Transportation, "Union Street Bicycle Transit Station;" District Department of Transportation, December 2006
49 "City of Santa Barbara Bikestation Needs Assessment"
50 ibid.
51 Steptoe, Sonja, "How Valet Parking Could Save the Planet;" Time Magazine, 24 May 2007
52 Technical Glass Products Website, "Chicago's Millennium Park Bicycle Station;" (http://www.fireglass.com/email/hot_topics/2005_05/); Accessed 9/9/08
53 Phone Interview with Josh Squire, Bike Chicago Rentals & Tours, 09/10/07

Center in Washington D.C will provide parking for 150 bicycles.[54] Bikestations are planned for Madison, WI, Hollywood, and Pasadena.

Chicago's McDonald's Cycle Center in particular is affected by the seasons. In the winter months, the McDonald's Cycle Center uses only 10% of its bicycle parking capacity.[55] To address this, the center is located near mass transit stations and Cycle Center users have access to the Chicago Transit Authority (CTA) trains and the Metro commuter rail or buses, which encourages year-round use. As in many cities, the McDonald's Center doubles as a multi-modal transfer points. As such, the Center may increase the distance that people will travel to reach public transit by several miles.[56]

Funding for the planning and installation of a bicycle transit center typically comes from a variety of sources including the federal government, transit agencies, state and local government, non-profit organizations and private sponsors. Bikestation, for example, is a non-profit organization and relies on grants to provide its services. The cost to build and maintain secure bicycle parking ranges from $1,500 for a locker to $5,000 per bicycle at full-service bicycle transit centers.[57] The McDonalds Cycle Center was built with a $3.1M federal Congestion Mitigation and Air Quality grant.[58] Despite the low fees, Bikestation facilities can cover significant portions of their operation costs, if capital costs are subsidized. In Bikestation Long Beach, membership and use fees cover more than two-thirds of the $150,000 annual operating costs.[59]

The indoor bicycle parking provided at the McDonalds Cycle Center. Image used with permission of McDonalds Cycle Center.

A rendering of the upcoming Washington DC Bikestation which hopes to encourage bicycle commuting in the District of Columbia. Image used with permission of the District Department of Transportation.

54 District Department of Transportation, "Union Street Bicycle Transit Station;" District Department of Transportation, December 2006
55 Phone Interview with Josh Squire, Bike Chicago Rentals & Tours, 09/10/07
56 Bikestation Website, "Top Bikestation Questions," (www.bikestation.org) Accessed 10/10/2007
57 Bikestation Website, "Reinventing the Park and Ride For Bicycle Transportation," (www.bikestation.org) Accessed 10/10/2007
58 Technical Glass Products Website, "Chicago's Millennium Park Bicycle Station;" (http://www.fireglass.com/email/hot_topics/2005_05/); Accessed 9/9/08
59 Steptoe, Sonja, "How Valet Parking Could Save the Planet;" Time Magazine, 24 May 2007

Examples and Opportunities in New York City:

Encouraging the creation of bicycle transit stations at major transportation hubs throughout the five boroughs could help New York City meet the goal of providing "necessary bicycling infrastructure such as bike racks and lockers..." outlined in PlaNYC 2030 and could encourage New Yorkers to add bicycles to their list of transportation and commuting options.

The secure bicycle parking provided by bicycle transit centers could be a major draw for many bicyclists, and potential bicycle commuters. Placing bicycle transit centers near protected greenways and at transit hubs in the Bronx and the eastern portions of Brooklyn and Queens could encourage use by commuters who currently must drive to the train. Bicycle transit centers west of Port Authority and east of the Queensboro Bridge could encourage residents of upper Manhattan to commute by bicycle even if they are afraid of traffic in midtown or lower Manhattan. A bicycle transit center at St. George could encourage Staten Island commuters to do part of their trip by bicycle. A bicycle transit center in lower Manhattan could be a boon to the many workers there.

Bicycle transit centers can be developed by the public sector, the private sector or through public-private partnerships. Mechanisms to encourage private sector creation of bicycle transit centers could include but are not limited to zoning requirements or incentives or tax incentives. Advertising or sales within the transit center could increase revenues.

WHEELCHAIR ACCESS FOR THE SUBWAY

Increasing wheelchair options in New York City's subways can dramatically increase the accessibility of the city's transit systems for a wide variety of New Yorkers including people in wheelchairs or with limited mobility, passengers with strollers and those carrying heavy packages. This report looks at three technologies: Wheelchair Accessible Escalators, Portable Wheelchair lifts and Universal Access Turnstiles.

Background:

Accessing the city's subway system can be difficult for many New Yorkers. There are a limited number of wheelchair accesible subway stations (elevators exist in 53 of the system's 468 stations) in the New York City transit system.[60] Riders often find elevators and escalators out of service. For riders with limited mobility, elevator and escalator outages can become, in the words of Howard Roberts, NYCT President, an "absolute bar" to use.[61]

Despite the MTA's understanding of the challenges that elevator and escalator outages pose to riders, repairing broken elevators can be difficult and is often time consuming. New York City's competitive procumement rules mean that there many different manufacturers providing elevators in the subway system, which makes it hard to stockpile standardized parts. In addition, each elevator is custom designed to its location which increases the maintenance challenges. At the extreme, advocacy groups have documented elevators that have remained out of service for up to nine months.[62]

The limited number of wheelchair accessible subway stations also poses problems. While many of these stations are major transfer points in the system—such as Times Square, Atlantic Avenue or Queens Plaza—the lack of elevators throughout the

60 Disabled Riders Coalition Website, "Subway Accessibility;" (http://www.disabledriders.org/NYC%20Subways.htm); Accessed 11/26/2007

61 Neuman, William, "Taking the Guesswork Out of Which Subway Escalators are Broken," The New York Times, 1 August, 2007

62 Interview with Michael Harris & Assemblyman Micah Kellner, Disabled Riders Coalition, 29 August, 2007

system restricts subway access in many portions of the city. For example, for Brooklyn residents, there are no wheelchair accessible stations on the L train between 14th Street/Union Square and the end of the line at Canarsie/Rockaway Parkway. There are eight wheelchair accessible stations in the Bronx. In Manhattan, there are five wheelchair accessible stations north of 72nd Street.

Under the terms of the settlement steming from the 1979 Eastern Paralyzed Veterans Association (now the United Spinal Association) lawsuit, the MTA is obligated to increase the number of accessible stations to 100 by 2020. However, the age and density of the subway infrastructure makes retrofitting stations to include elevators complicated, time consuming and expensive.

To address immediate concerns about escalator and elevator outages, the MTA announced in August, 2007, that it would post information about elevator outages on its website. Information will updated three times a day. However, roughly 2/3 of the elevators in the system require outages and problems to be reported manually to a station agent, (the other 1/3 are equiped with real-time automatic monitoring) which can limit the timeliness of the information.[63] The PATH Train's PATHVISION information monitors provide elevator outage information within the PATH system which could serve as a model for NYCT.

Efforts by the MTA to place automatic monitoring systems in all the elevators and escalators is hampered by the presence of easement elevators and escalators such as the escalators at Union Square or the elevator on the 7 platform at Times Square. These elevators and escalators are maintained by the entity providing the easement; they are not under the MTA's jurisdiction. Problems with easement elevators and escalators are not reported to the MTA.

New York's traditional rotary turnstiles can also pose access problems for people with limited mobility. Designed to deter turnstile-jumping, these turnstiles are too narrow to allow people in wheelchairs to pass through and can pose problems for people on crutches, people with strollers or bicycles, or people carrying large packages. The MTA provides the "auto-gate" automatic entry and exit system at all accessible locations which allows approved riders to access the subway system with their Reduced-Fare AutoGate MetroCard. However, the waiting period to receive the card can be up to four months, making subway access difficult for any tourists or visitors who use wheelchairs.[64]

63 Neuman, William, "Taking the Guesswork Out of Which Subway Escalators are Broken," The New York Times, 1 August, 2007

64 Interview with Michael Harris & Assemblyman Micah Kellner, Disabled Riders Coalition, 29 August, 2007

Case Study 19: Wheelchair Accessible Escalators & Lifts (Osaka & Yokohama, Japan)

Wheelchairs are secured by a guardrail in the back and an attendant who holds the wheelchair in place. Image used with permission of Kansai International Airport (KIAC).

Wheelchair-Accessible Escalators and Emergency Wheelchair Lifts are two options for increasing access to public transit systems while working within limited space confines. While both have technical and operational issues that may limit their immediate applicability in New York, they are included here as technologies to watch in the future.

Wheelchair-accessible escalators are found in Japan. They are manufactured by Hitatchi and are in use at Kansai International Airport near Osaka and throughout the city of Yokohama in their subway and rail stations. Portable Wheelchair Lifts, produced and marketed by a number of commercial vendors, are in widespread use in a variety of public and private settings throughout the United States.

Wheelchair-Accessible Escalators

Installed in 1994, there are 10 wheelchair-accessible escalators currently in use in the Kansai International Airport.[65] Most of the time, the wheelchair-accessible escalators operate as conventional escalators; when needed, however, three escalator stairs fuse to form a single platform large enough for a wheelchair, baby carriage or grocery cart. To initiate the platform function, a station attendant stops the escalator and puts it into "wheelchair" mode. The fusing process takes a little less than one minute.[66]

The Kansai Airport policies mandate that wheelchairs be secured on the escalator platform in three ways; wheel locks on the wheelchair itself, a rear guard strip on the back of the escalator platform and the presence of an airline employee who holds the wheelchair throughout the trip. Because the platform only takes up three escalators stairs, other passengers can ride the escalator while it is in "wheelchair" mode. However Kansai Airport regulations forbid this practice.[67]

At Kansai, wheelchair accessible escalators do not serve as a replacement for elevators; rather they are used where elevators are infeasible. Indeed, Kansai Airport staff report that the wheelchair accessible escalators are a second choice to elevators for most passengers. Elevators, which do not require assistance and are familiar technology, are clearly preferable.

Wheelchair-accessible escalators cost more than conventional escalators; Kansai's escalators cost about 40,000,000JPY (approximately $350,000), as opposed to 10,000,000JPY (approximately $90,000) for a conventional escalators and may be more difficult to maintain.[68] In addition to Hitatchi, other manufacturers are developing wheelchair accessible escalators. Costs, operations and maintenance may vary.

65 Email Correspondence with Ken Yoshioka, Kansai International Airport (KIAC), (12/7/2007)
66 ibid.
67 ibid.
68 ibid., (12/7/2007 and 12/11/2007)

Garaventa's Super-Trac portable wheelchair lift allows wheelchair users to go up and down stairs easily. No permanent infrastructure is required and the operator does not do any lifting. Image used with permission of Garaventa.

Emergency Wheelchair Lifts

Portable wheelchair lifts offer emergency access options for subway stations. Super-Trac, manufactured by Garaventa Lift, is one example. Super-Trac is self-propelled stair climber with a platform large enough to accommodate most manual and electric wheelchairs. Its dual electric motors allow it to carry up to 440 pounds and it can climb up to 30 flights of stairs before needing to be recharged.[69] Smaller auxiliary wheels allow the Super-Trac to roll easily on stair landings which makes the system feasible in locations with multiple landings and flights of stairs.

Wheelchairs are secured on the Super-Trac by means of four adjustable straps and a seatbelt. Like all other portable lifts, Super-Trac requires a standing aide to operate the manual controls. However, unlike many other portable lifts on the market, the Super-Trac system does not require the standing aide to do any lifting.[70] Super-Trac can bring wheelchairs up stairs at a rate of about 21 feet per minute and down stairs at a rate of around 35 feet per minute. Motion both up and down is regulated by an electromagnetic fail-safe brake.[71]

Garaventa also produces an emergency-specific evacuation lift, called Evacu-Trac, that combines the user's body weight with a speed controlling mechanism and fail-safe brakes to quickly move people with limited mobility down stairs in case of an emergency. The Evacu-Trac system uses fire-retardant slings and securing straps to hold users in place and can carry up to 300 pounds.[72]

69 Garaventa Lift Website, "Super-Trac," (http://www.garaventa.ca/portable-wheelchair-lift/); Accessed 12/7/2007
70 ibid.
71 Garaventa Lift Website, "Specifications," (http://www.garaventa.ca/portable-wheelchair-lift/spc.html); Accessed 12/7/2007
72 Garaventa Lift Website, "Evacu-Trac Features," (http://www.garaventa.ca/et/feat.html); Accessed 12/7/2007

Case Study 20: Universal Access Turnstiles
(San Francisco, CA; Boston, MA; Washington DC; PATH, JFK AirTrain)

The Washington D.C. Metro features an universal access turnstile in every station which provides people in wheelchairs or with strollers or bulky packages easier access to the Metro. NYC Dept. City Planning

Universal Access Turnstiles are turnstiles with an electronic retractable gate instead of the typical spinning bar. Their configuration allows all riders, including people in wheelchairs or on crutches, people with strollers or bicycles, or people carrying large packages, to easily enter or exit stations.

Low Universal Access Turnstiles are the primary turnstiles for the JFK AirTrain, Bay Area Rapid Transit (BART) in San Francisco Bay, the Washington DC Metro, and the Massachusetts Bay Transit Authority (MBTA) "T". These turnstiles are typically placed in view of stations agents to avoid fare beating. Tall Universal Access Turnstiles, like those used in the NY/NJ PATH Train system, address access issues while still deterring fare jumping.

Cubic Transportation Systems designed the turnstiles for PATH, which include sensors that detect wheelchairs and baby strollers and allow them to pass through. PATH has not heard of any major

Universal access turnstiles in use for the JFK AirTrain. NYC Dept. City Planning

malfunctions regarding the use of these turnstiles.[73]

The cost is approximately $70,000 per gate.[74]

Examples and Opportunities in New York City:

Embracing wheelchair-friendly technologies in the New York City subway system can dramatically increase transit options for New Yorkers with limited mobility or people with baby strollers or large packages and, in accordance with PlaNYC 2030 improve access to subways and commuter rail.

Elevators are preferable to escalators because they are faster, easier and do not require users to ask for additional assistance. However, there are some stations and locations within the NYCT system where elevators are not feasible. In these places, wheelchair accessible escalators may be appropriate. The escalator technology would need to be thoroughly evaluated to see if it could be adapted to MTA/NYCT standards. Negotiations

73 Phone Interview with Henry Rosen, PATH 9/26/2007
74 Email Correspondence with Jeffrey Garcia, Project Manager, BART, 9/7/2007

and training with MTA/NYCT employees would also be required. In addition, such escalators could only be installed in proximity to 24-hour staffed booths. NYCT should continue to monitor wheelchair accessible escalator technology as it improves and could consider a New York City pilot in order to spur further research and development.

Emergency wheelchair stair climbers, while not sufficient for everyday use, could be stored in every station to aid in emergencies or to serve as a back-up when elevators are out of service.

While low universal access turnstiles are infeasible in New York due to concerns about fare-beating, tall universal access turnstiles could be added to the NYCT system. In particular, tall universal access turnstiles, opened with a typical MetroCard, could limit the use of the emergency gate in non-emergency situations.

TAXI VOUCHERS AND ACCESSIBLE TAXIS

Increasing the number of wheelchair-accessible taxis and offering taxi-vouchers for people in wheelchairs who cannot take the subway are two ways to increase transportation options for New Yorkers and visitors with limited mobility while utilizing an existing city resource, the licensed taxi fleet.

Background:

Public transportation around New York for people in wheelchairs is limited. The city's subway system, as discussed in previous chapters, has a limited number of wheelchair accessible stations. The city's bus fleet, which is entirely wheelchair accessible, picks up some of the unmet demand and has a wheelchair ridership of 64,000 per month.[75] However, the buses make frequent stops and as a result are slower than subways or regular traffic. New York's third option, the Access-A-Ride (AAR) a door-to-door para-transit service, is meant to fill the gaps for riders with disabilities who are unable to ride the subway or bus. AAR service, which provides transportation 24 hours a day, seven days a week, is mandated in order to comply with the 1990 Americans With Disabilities Act. AAR service costs the MTA $55.72 per scheduled trip and serves, on average, 10,500 riders per day.[76]

However, AAR service has substantial limitations. Trips on AAR must be scheduled at least 24 hours in advance and service is not guaranteed. Nor are there guarantees or estimates about the length of a trip, making it difficult for users to rely on the service for important appointments. Passengers may not bring more than two small bags (for a total maximum of 40lbs) or bulky objects like "rolls of paper towels" into an AAR vehicle, making a trip to the grocery store, for example, difficult on AAR.[77]

75 Luo, Michael. "A Little Movement Toward More Taxis for Wheelchairs." The New York Times, 25 August 2004

76 Niblack, C. Preston; "Using Taxi Vouchers to Lower the Cost of Paratransit Services;" NYC Independent Budget Office, June 2007 (www.ibo.nyc.ny.us/iboreports/webTaxiVouchersJune07.pdf); Accessed 11/16/07 & Luo, Michael. "A Little Movement Toward More Taxis for Wheelchairs." The New York Times, 25 August 2004

77 Levy, Michael; "When to Shop and When to Stop;" On The Move, Access-A-Ride, Summer/Fall 2006, Volume 4, p.7

Taxis represent a fourth and growing option for New Yorkers and visitors in wheelchairs. In 2004, only 3 of New York's 12,487 taxis were wheelchair accessible.[78] Today, 81 taxis are accessible.[79] At the most recent individual taxi medallion auction, most of the 150 medallions up for sale were for wheelchair accessible cabs.[80] Since riders cannot guarantee that the taxi they hail will be wheelchair accessible, the city has begun experimenting with 311 technology to allow New Yorkers to better utilize this growing wheelchair accessible taxi fleet. On November 13th, 2007 the Taxi and Limousine Commission (TLC) announced a new pilot program to connect wheelchair user with wheelchair accessible taxis using the city's existing 311 system.[81]

Case Study 21: Taxi Access Program (Chicago, IL)

Chicago's Taxi Access Program (TAP) allows the city to increase options for disabled residents by encouraging them to use the city's existing taxi fleet for spontaneous trips, for example to the store or doctor's appointment or for social purposes. Routine trips, such as trips to work or school which have fixed origin and destination points are handled through Chicago's Mobility Direct subscription service. Chicago also has a conventional para-transit service similar to AAR.

Under TAP, residents apply for a Paratransit ID and then can purchase vouchers to use taxi cabs up to four times per day. As of September 1st, 2007, vouchers cost $5.50 and provide the user with up to $13.50 in taxi fare (an $8 subsidy).[82] To use the service, individuals call their local taxi service, inform them that they plan to use a TAP voucher, and schedule a ride anytime of the day. Since not all of Chicago's taxis are wheelchair accessible, riders must call a dispatcher at least 20 minutes in advance who will then locate an appropriate taxi. All taxi companies and drivers are required to accept the vouchers. RTA reimburses the taxi company for fare amounts up to $13.50.[83] If the fare is above $13.50, the customer is responsible for the difference. The average Chicago taxi ride is about 5 miles and costs $12.70.[84] This three-option para-transit system allows the RTA to allocate services in a way that accounts for cost differences between short and long trips.

Advances in Wheelchair Accessible Taxis:

Advances in taxi technology also present opportunities for New York. For riders with limited mobility, wheelchair accessible taxis are more reliable and convenient than a crowded bus or limited subway access. In particular, many people who use wheelchairs like the idea of wheelchair-accessible taxis in addition to contracted services like AAR because it allows them an increased degree of freedom and "spontaneity."[85]

Standard Taxi, the presenting sponsor of the Taxi '07 exhibit at the 2007 New York International Auto Show, is an example of a wheelchair-accessible taxicab. In addition to a built-in wheelchair ramp, Standard Taxis boast increased interior seating (four passengers plus a wheelchair), large easily loaded trunks and standardized, interchangeable body panels, windows and bumpers for reduced repair costs. Standard Taxi is currently being designed with a GM V6 engine that gets 12-15 mpg (below

78 Luo, Michael. "A Little Movement Toward More Taxis for Wheelchairs." The New York Times, 25 August 2004

79 New York City Taxi and Limousine Commission. Demonstration Project: Accessible Vehicle Dispatch Proposal. 10 May 2007. (http://www.nyc.gov/html/tlc/html/news/info_presentations.shtml); Accessed 11/26/2007

80 Miller, Winter, "Cabdrivers Sweat It Out Bidding on Medallions;" The New York Times, 2 November 2007

81 NYC Taxi and Limousine Commission, "Press Release: Taxi and Limousine Commission Approves Accessible Dispatch System Pilot Program;" NYC Taxi and Limousine Commission Website (http://www.nyc.gov/html/tlc/html/home/home.shtml); Accessed 11/16/07

82 Transit Future Website, "Transit Future Update: 13 August 2007;" (http://transitfuture.cnt.org/2007/08/13/transit-future-update-august-13-2007/); Accessed 11/20/2007

83 Chicago Transit Authority (CTA), "PRESS RELEASE: CTA Increases Mobility Direct Subsidy;" 13 May, 2005 (http://www.transitchicago.com/news/archpress.wu?action=displayarticledetail&articleid=105235); Accessed 11/20/2007.

84 Woodward, Whitney, "Cab-Fare Hike Plea Goes Nowhere;" Chicago Tribune, 24 October 2007.

85 Luo, Michael. "A Little Movement Toward More Taxis for Wheelchairs." The New York Times, 25 August 2004

New York City's recently proposed standards) but has an engine

The Standard Taxi features a lowered chaisis and a built-in wheelchair ramp. It holds four passengers in addition to a wheelchair. Image used with permission of The Vehicle Production Group LLC (www.standardtaxi.com).

cavity that can fit a variety of different conventional and hybrid motors allowing operators to upgrade as desired.[86]

Standard Taxi, manufactured by the Vehicle Production Group in partnership with AM General LLC, is scheduled to go into full production in 2009.[87] Numerous North American cities, such as Alexandria, VA and Ottawa, Canada have expressed interest in purchasing Standard Taxis for their fleets.

Examples and Opportunities in New York City:

The introduction of a taxi vouchers to supplement the existing Access-a-Ride (AAR) program could reduce the cost of the city's legally mandated disability access programs and help meet the PlaNYC 2030 goal of improving access to existing transit.

In order for taxi vouchers to be successful, the city must increase the number of wheelchair-accessible taxis. The Taxi and Limousine Commission (TLC) has already taken strides in acquiring and auctioning more wheelchair-accessible taxis in recent months. New taxi technologies could be considered by the TLC in order to help meet this goal. In addition, in keeping with other 2030 PlaNYC goals, hybrid engine or high-performance technologies should be considered in any new taxi authorization.

A 2007 report on taxi vouchers recently released by the NYC Independent Budget Office suggests that a similar system could provide substantial savings to New York City. For example, AAR trips cost the MTA $55.72 per scheduled trip. However, in Manhattan AAR trips are typically less than a mile—usually a less than $10 taxi fare—whereas AAR trips in Queens and Staten Island are usually over seven miles—substantially more. In general, 90% of New York City's AAR rides are between .25 and 5.3 miles; but with AAR these trips cost the same.[88] Selling vouchers to subsidize taxi rides up to $10 (roughly the average cost of a taxi ride in 2007 according to the City's Independent Budget Office) and using AAR only for longer trips could result in substantial cost savings. In its 2007 report on taxi vouchers, the Independent Budget Office found that NYCT would save approximately $13 million dollars per year if a $10 taxi voucher system were put in place.[89]

86 Phone Interview with Marc Klein, CEO Standard Taxi (11/15/2007)

87 Standard Taxi, "Standard Taxi E-Mail Newsletter: Made in the U.S.A.! VPG partnerswith AM General to build the Standard Taxi;" 12/20/07

88 Niblack, C. Preston; "Using Taxi Vouchers to Lower the Cost of Paratransit Services;" NYC Independent Budget Office, June 2007 (www.ibo.nyc.ny.us/iboreports/webTaxiVouchersJune07.pdf); Accessed 11/16/07

89 ibid.